# SRC3D – Source Reconstruction Tool Based on Near Field Scanning

General Overview

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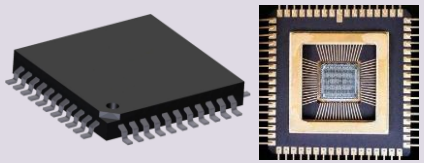
# Source Reconstruction Tool Based on Near Field Scanning

## Pass / Fail Detection Analysis Based on EMC Simulations

**Integrated Package (IC)**

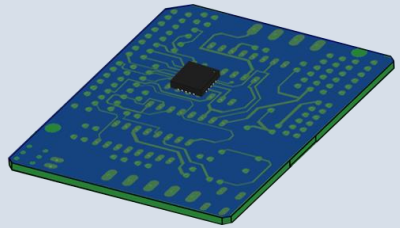


S-parameters, IBIS models

**PROBLEM!**

3D modeling details of IC packages are unknown due to the commercial confidentiality of the suppliers.

**PCB Model**



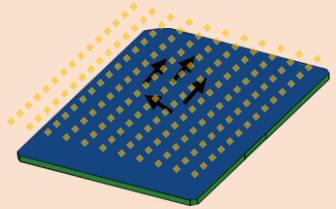
**3D Model Construction (IC+PCB)**

**Simulation Model (IC+PCB)**

PASS / FAIL RESULTS ANALYSIS BASED ON STANDARD LIMITS

**Near Field Scanning**

**SRC3D - Source Reconstruction Tool**



Current version of EMCoS Source Reconstruction Tool (SRC3D) is using 1-2 equivalent magnetic dipoles for representation of complex radiating systems. Measured tangential H fields are considered to be given as phaseless data.

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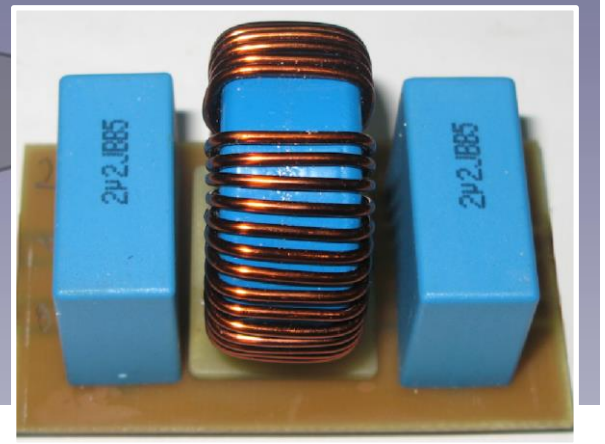
# SRC3D Application Examples

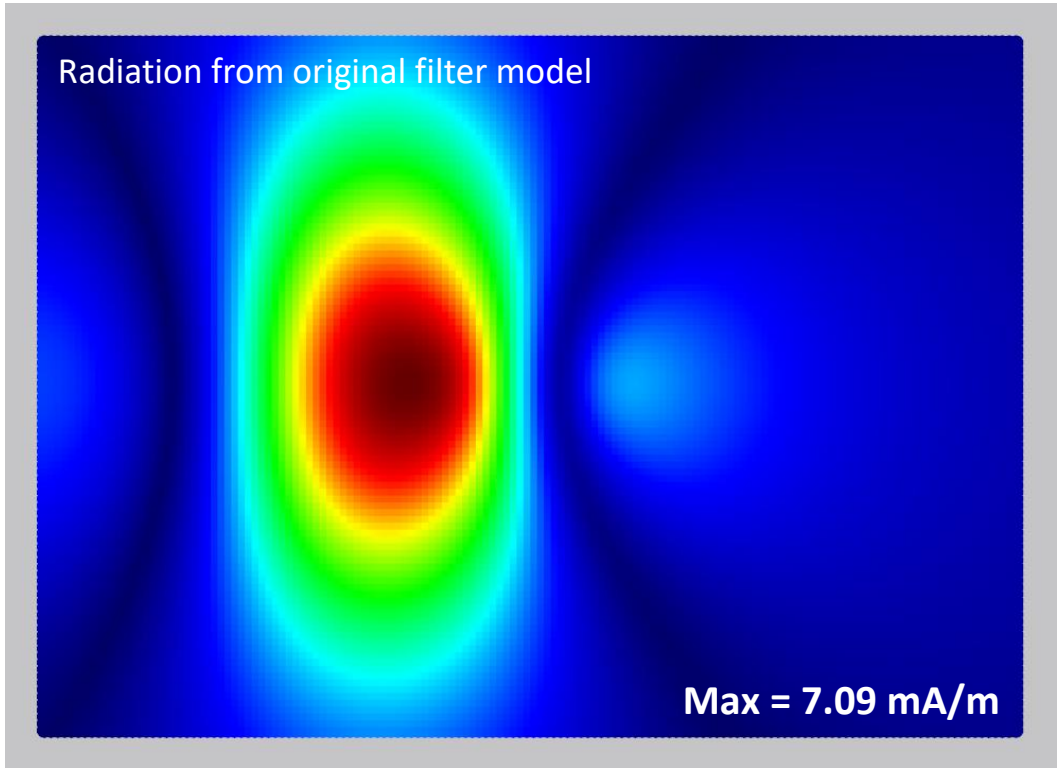
## Modeling of LC Filter Performance – Simulation Model Description

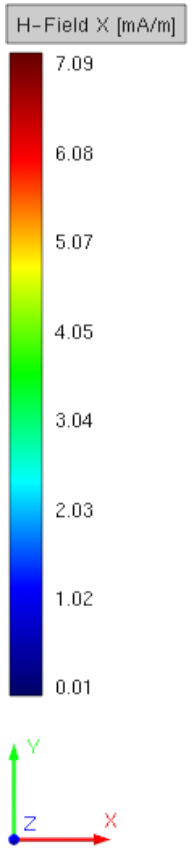
**Near Field Scanning Plane**
Dimensions – 143 mm x 101 mm
Distance to ground – 70 mm
Total number of field points – 14688

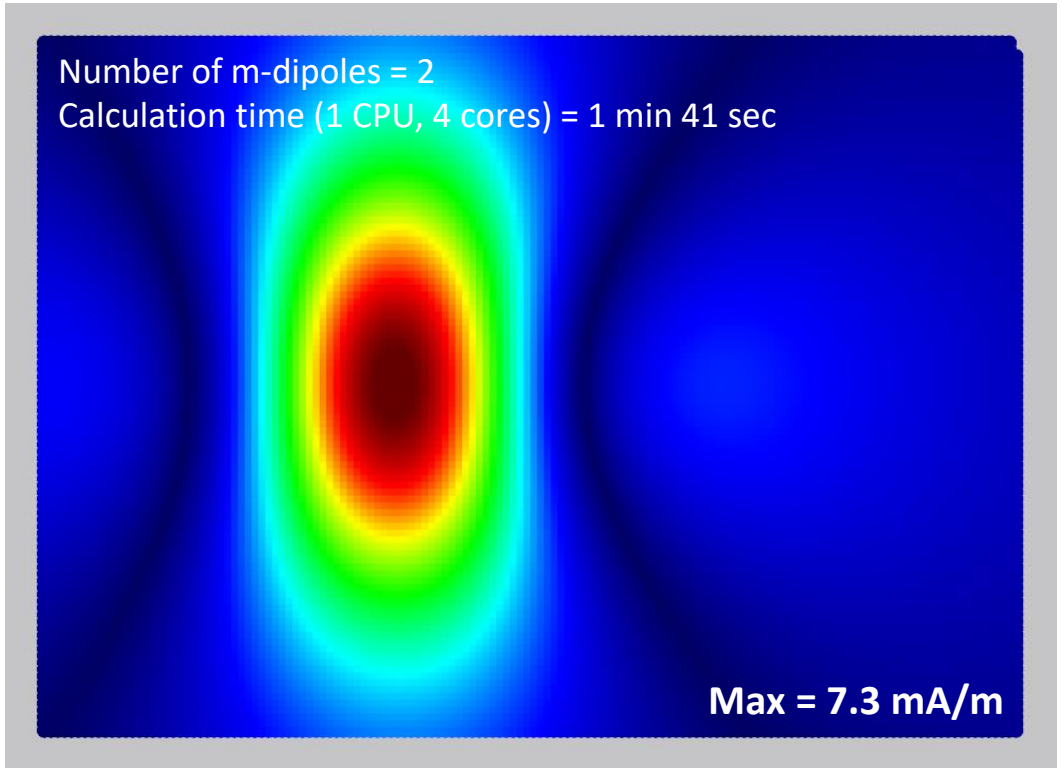


# SRC3D Application Examples

## Modeling of LC Filter Performance – Results Comparison




Original |Hx| field, [4.5 MHz]

Reconstructed |Hx| field, [4.5 MHz]

| Property | Value |
|---|---|
| Name | Magnetic Dipole 1 |
| Type | Magnetic |
| Position | [-0.019; 0.074497886965; 0.0315469168032] |
| Theta | 81.0 |
| Phi | 0.0 |
| Magnitude | 0.000179813863996 |
| Phase | 0.0 |

| Property | Value |
|---|---|
| Name | Magnetic Dipole 2 |
| Type | Magnetic |
| Position | [-0.009; 0.074497886965; 0.0190000001976] |
| Theta | 9.0 |
| Phi | 8.57142857143 |
| Magnitude | 3.04306396796e-05 |
| Phase | 0.0 |

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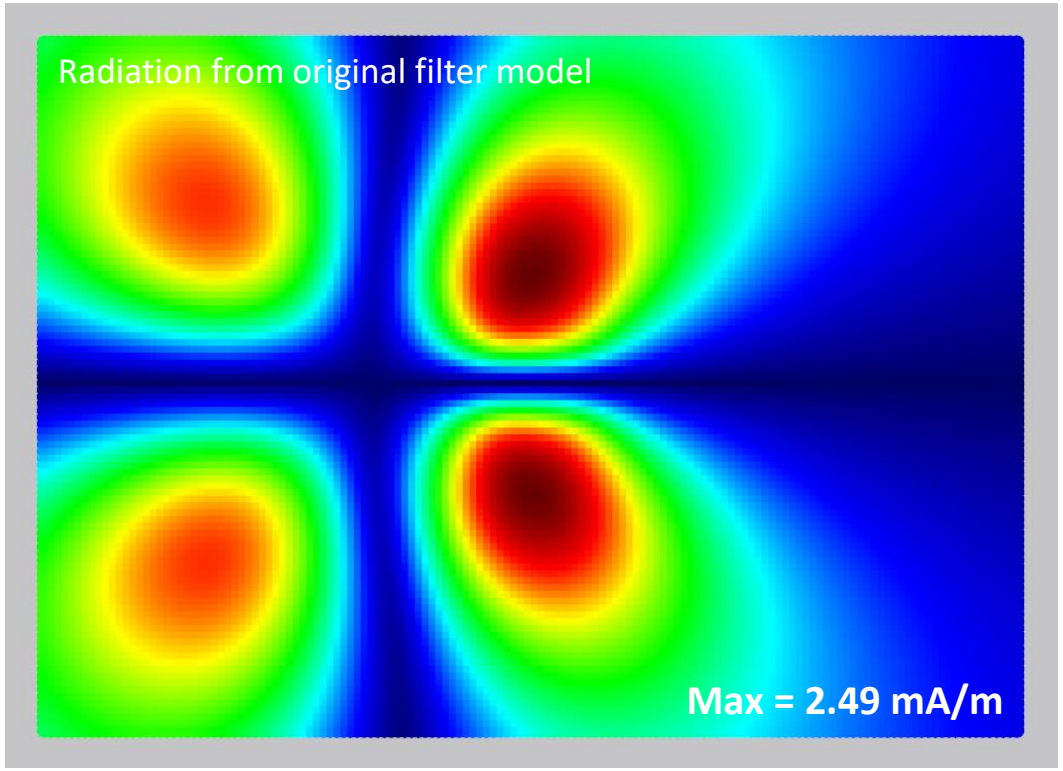
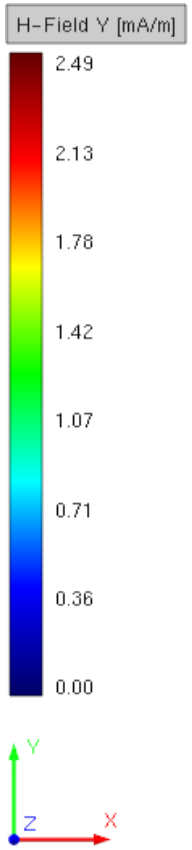
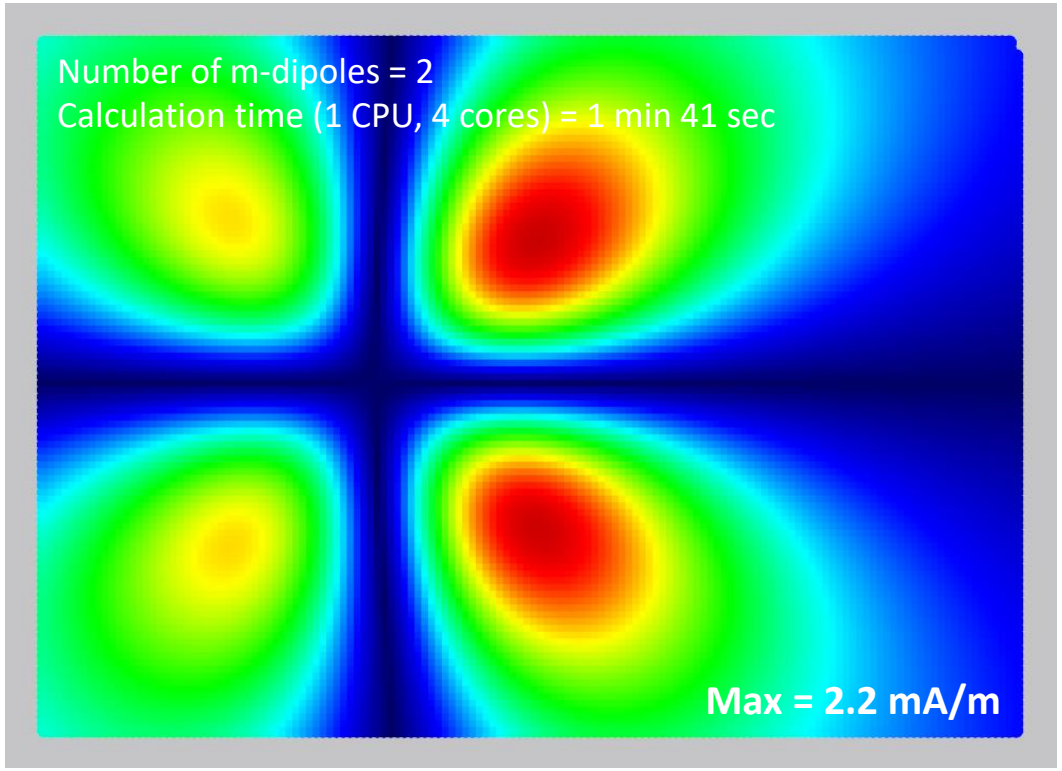
# SRC3D Application Examples

## Modeling of LC Filter Performance – Results Comparison




Original |Hy| field, [4.5 MHz]

Reconstructed |Hy| field, [4.5 MHz]

| Property | Value |
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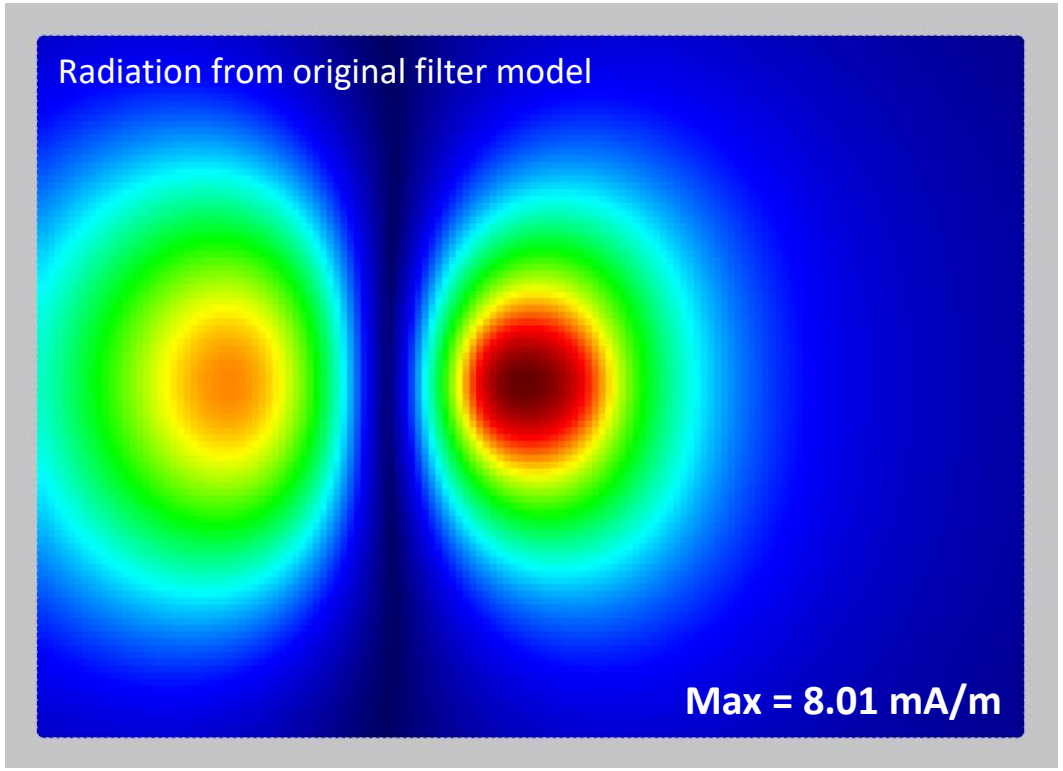
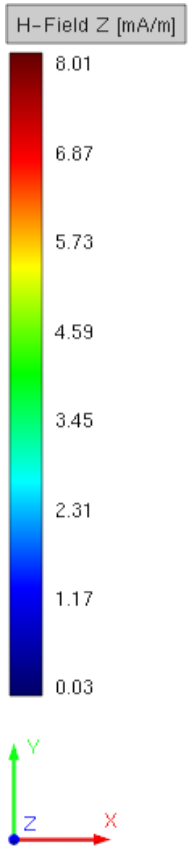
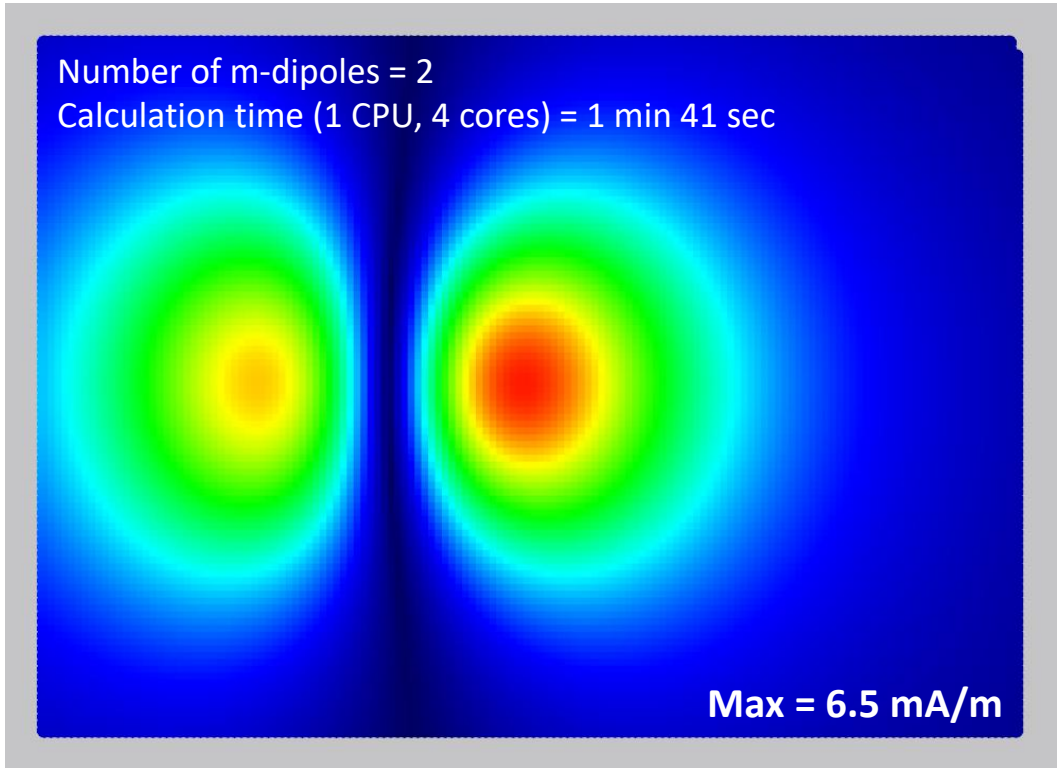
# SRC3D Application Examples

## Modeling of LC Filter Performance – Results Comparison




Original |Hz| field, [4.5 MHz]

Reconstructed |Hz| field, [4.5 MHz]

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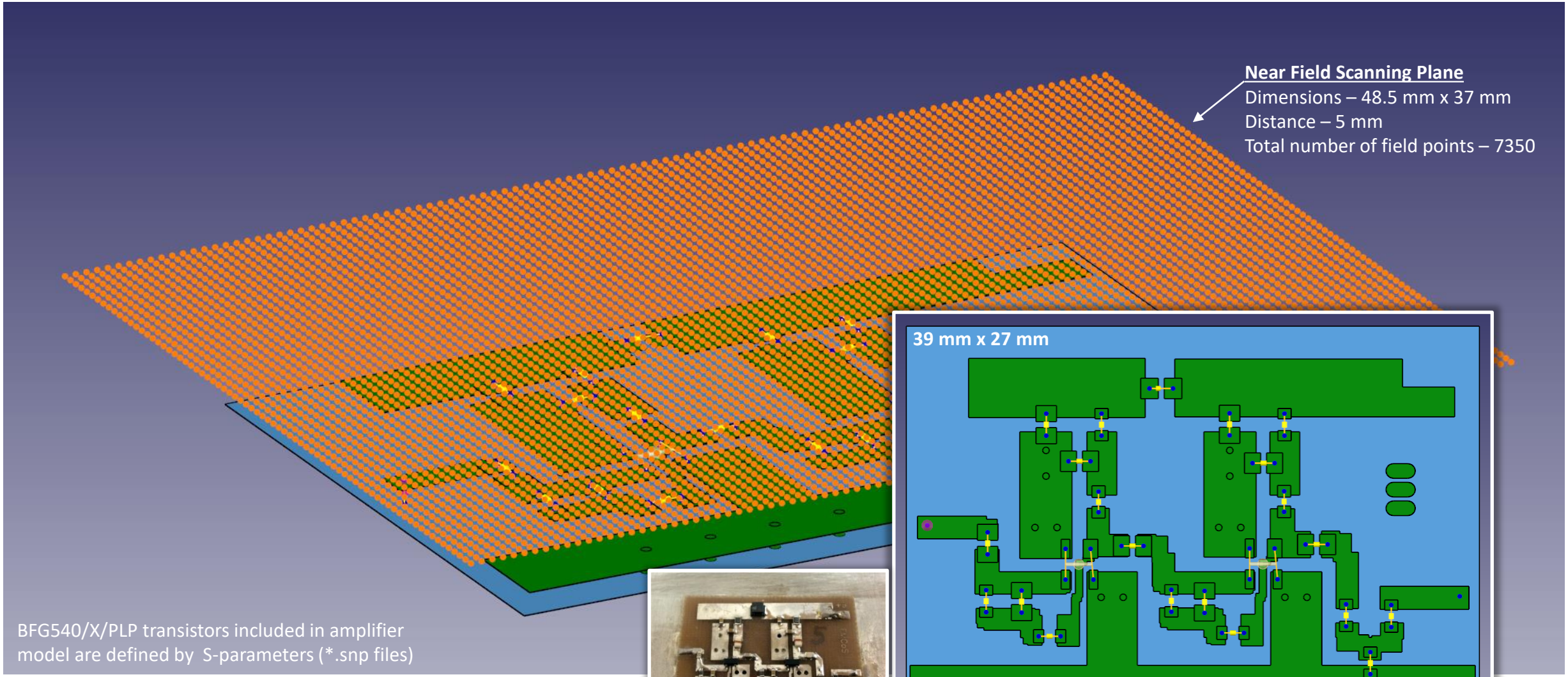
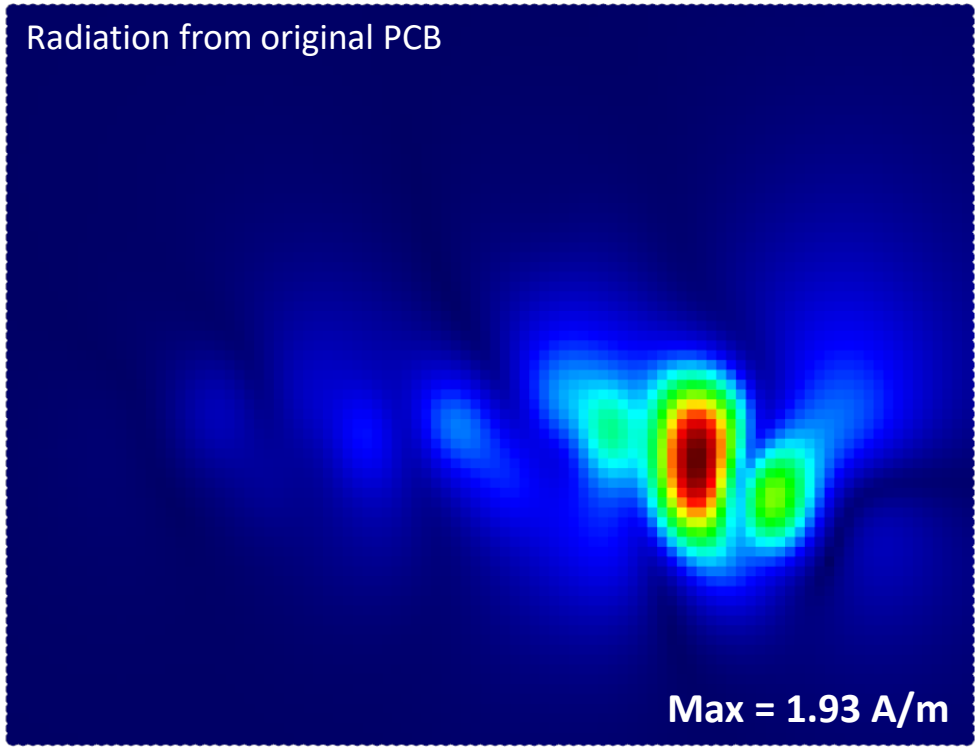
# SRC3D Application Examples

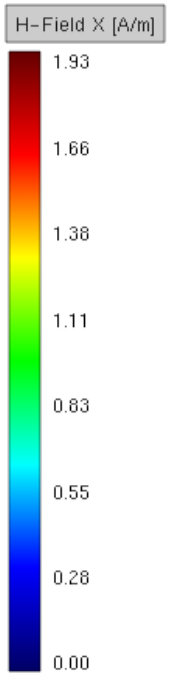
## Radiation from GSM Band Amplifier – Simulation Model Description

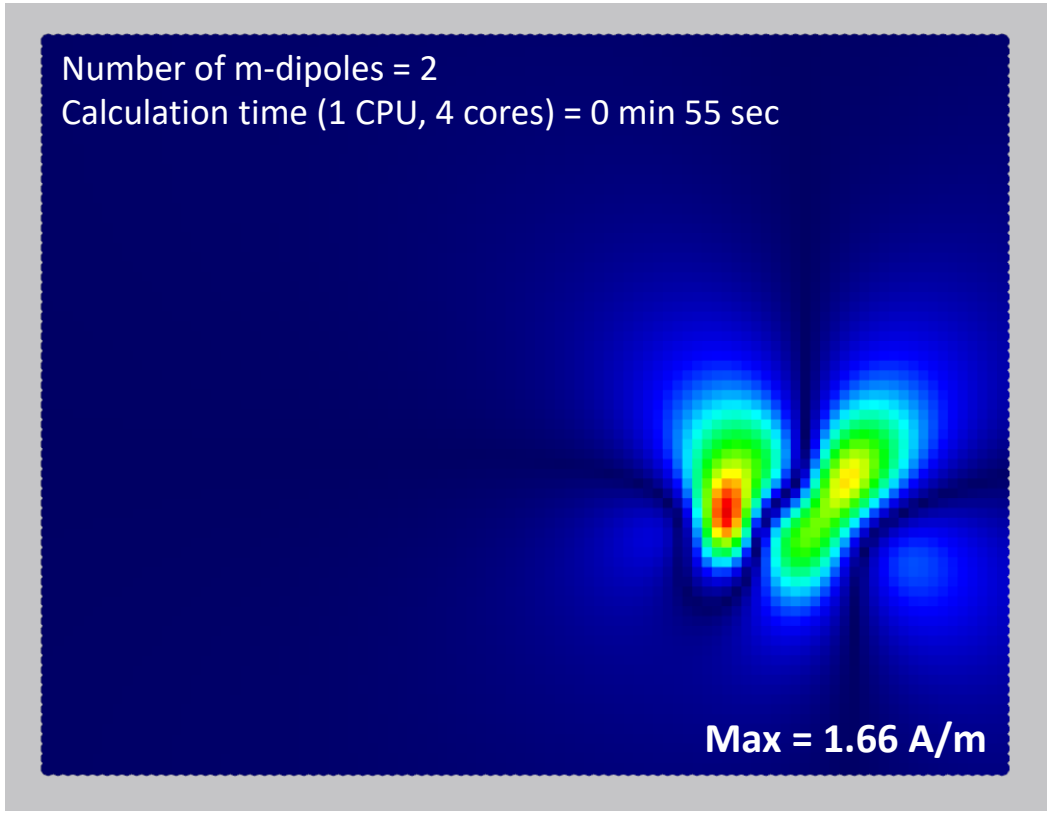


# SRC3D Application Examples

## Radiation from GSM Band Amplifier – Results Comparison




Original |Hx| field, [1.5 GHz]

Reconstructed |Hx| field, [1.5 GHz]

| Property | Value |
|---|---|
| Name | Magnetic Dipole 1 |
| Type | Magnetic |
| Position | [0.0562424; 0.1879256; 0.000750002357484] |
| Theta | 72.0 |
| Phi | 68.5714285714 |
| Magnitude | 0.0215776242655 |
| Phase | 0.0 |

| Property | Value |
|---|---|
| Name | Magnetic Dipole 2 |
| Type | Magnetic |
| Position | [0.0512424; 0.1869256; 0.00198471406394] |
| Theta | 90.0 |
| Phi | 0.0 |
| Magnitude | 0.0059955248824 |
| Phase | 0.0 |

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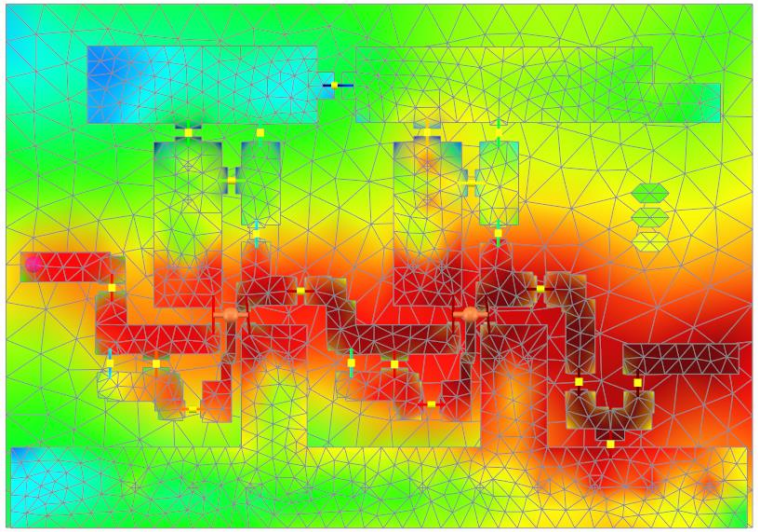
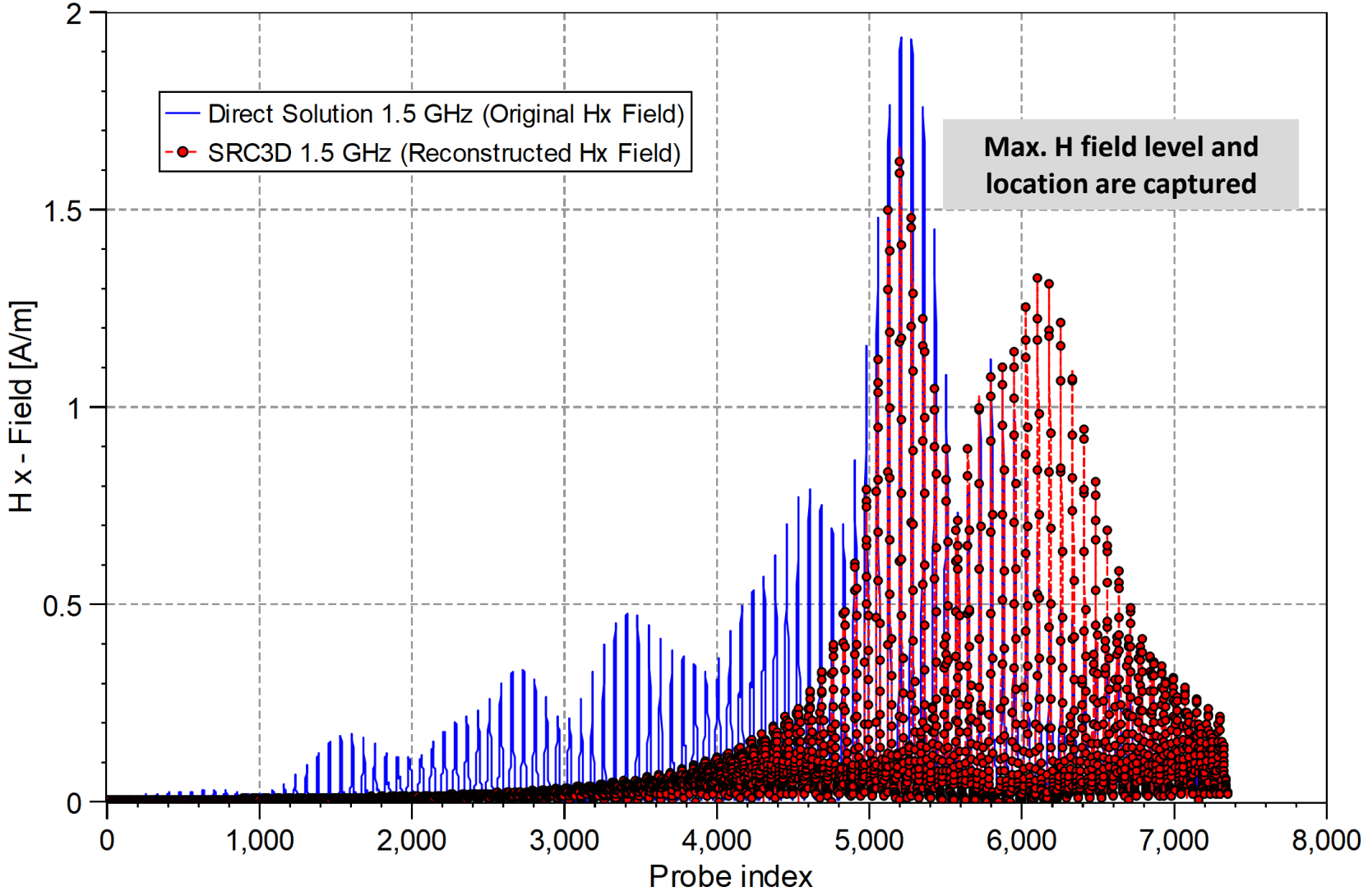
# SRC3D Application Examples

## Radiation from GSM Band Amplifier – Results Comparison

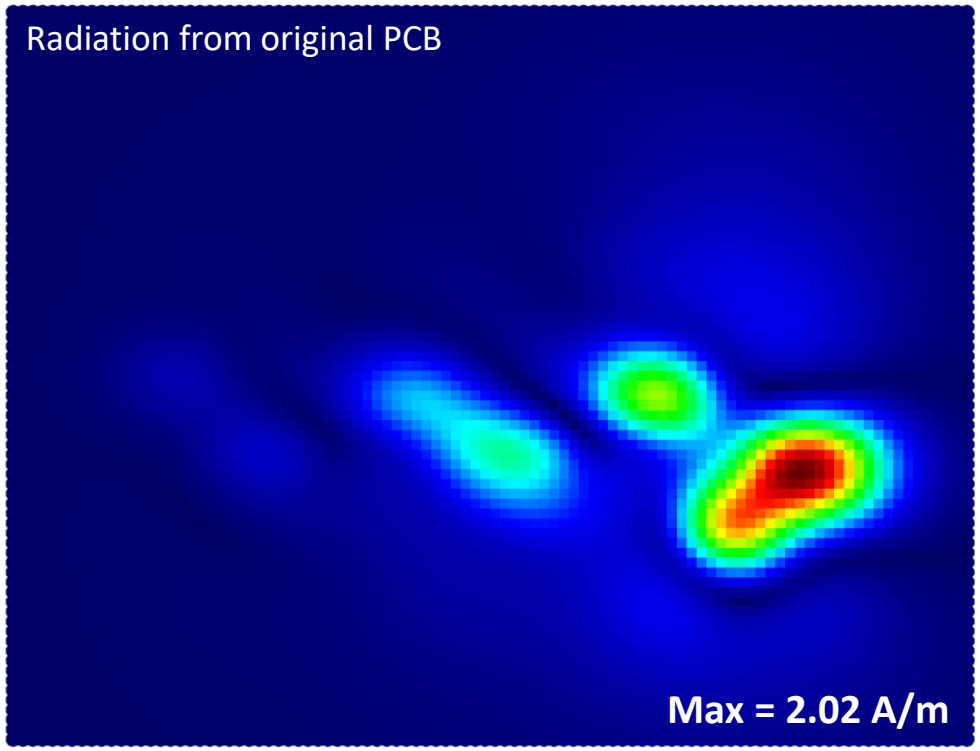


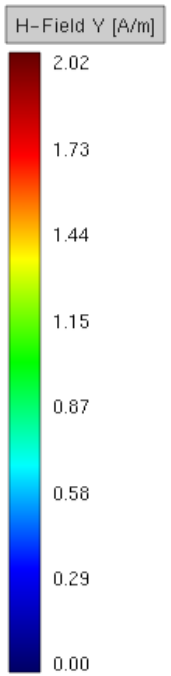
Current Distribution 1.5 GHz

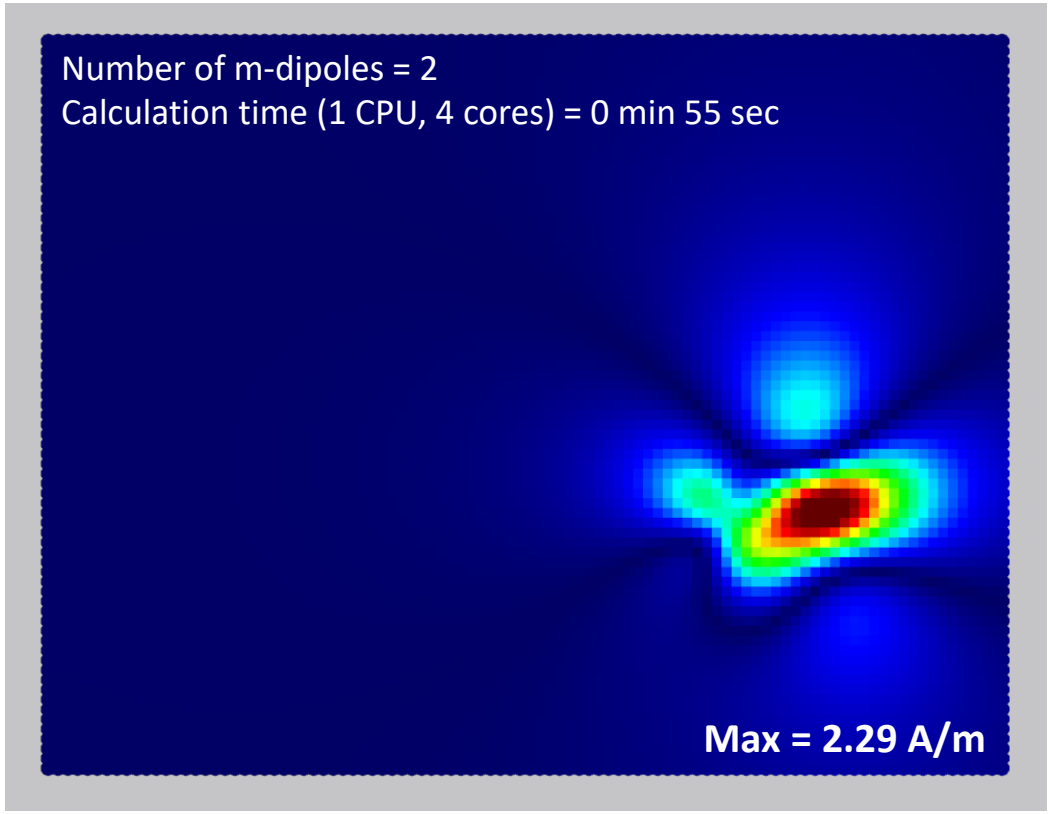


# SRC3D Application Examples

## Radiation from GSM Band Amplifier – Results Comparison




Original |Hy| field, [1.5 GHz]

Reconstructed |Hy| field, [1.5 GHz]

| Property | Value |
|---|---|
| Name | Magnetic Dipole 1 |
| Type | Magnetic |
| Position | [0.0562424; 0.1879256; 0.000750002357484] |
| Theta | 72.0 |
| Phi | 68.5714285714 |
| Magnitude | 0.0215776242655 |
| Phase | 0.0 |

| Property | Value |
|---|---|
| Name | Magnetic Dipole 2 |
| Type | Magnetic |
| Position | [0.0512424; 0.1869256; 0.00198471406394] |
| Theta | 90.0 |
| Phi | 0.0 |
| Magnitude | 0.0059955248824 |
| Phase | 0.0 |

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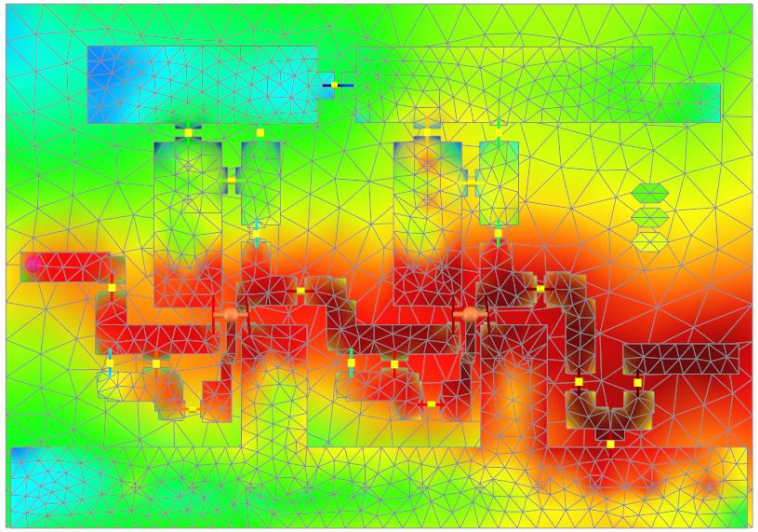
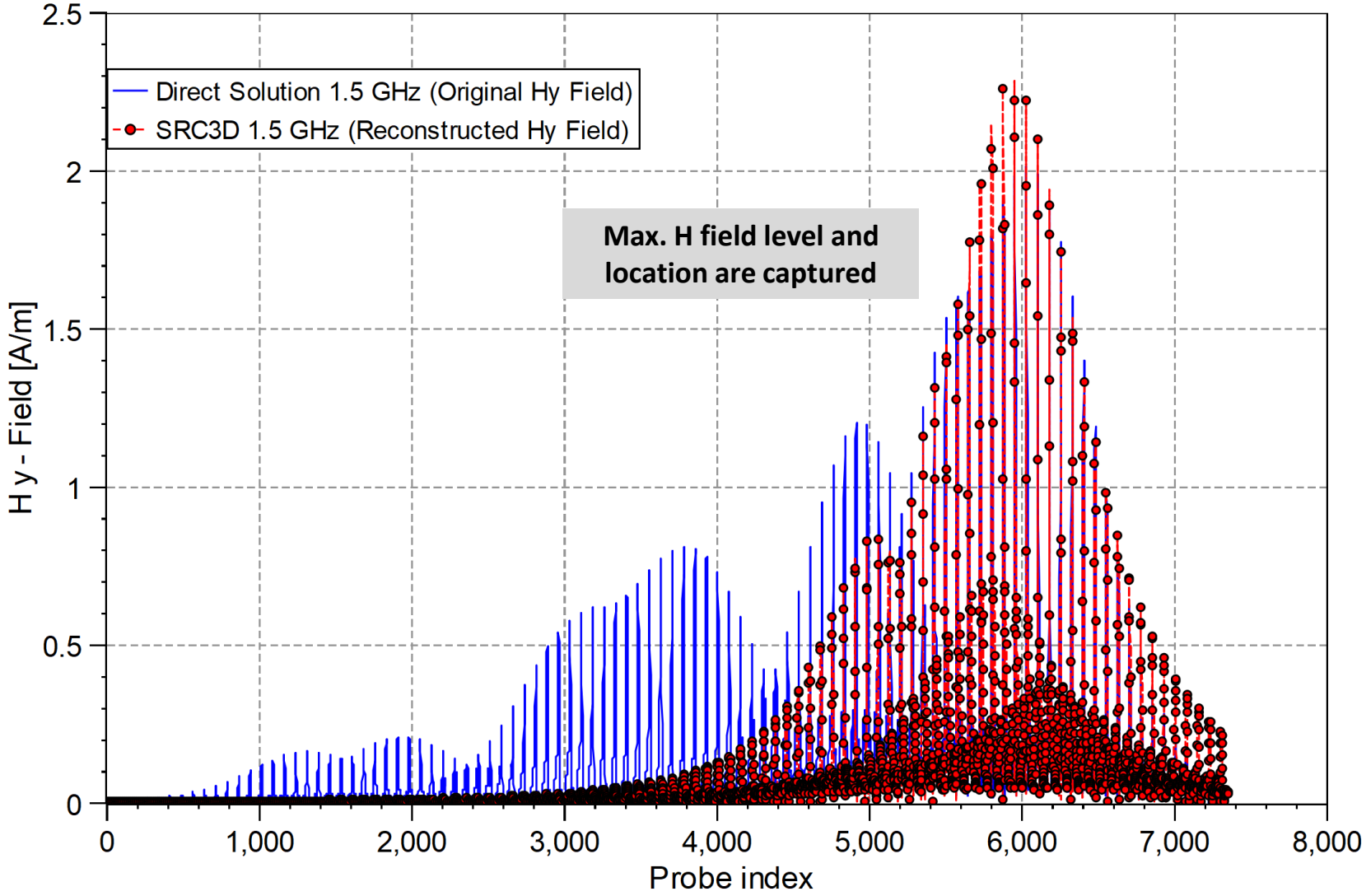
# SRC3D Application Examples

## Radiation from GSM Band Amplifier – Results Comparison

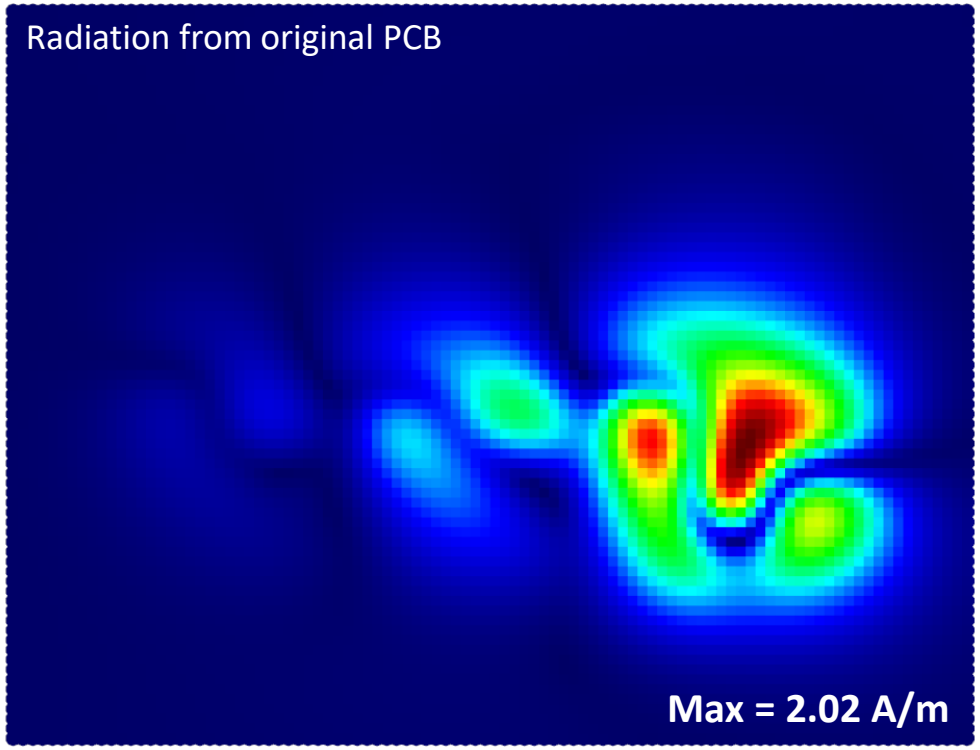


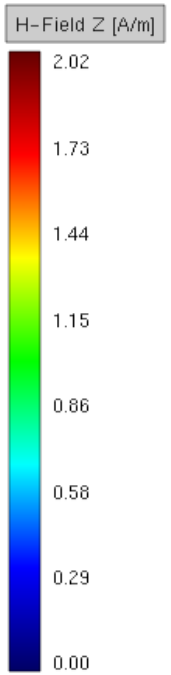
Current Distribution 1.5 GHz

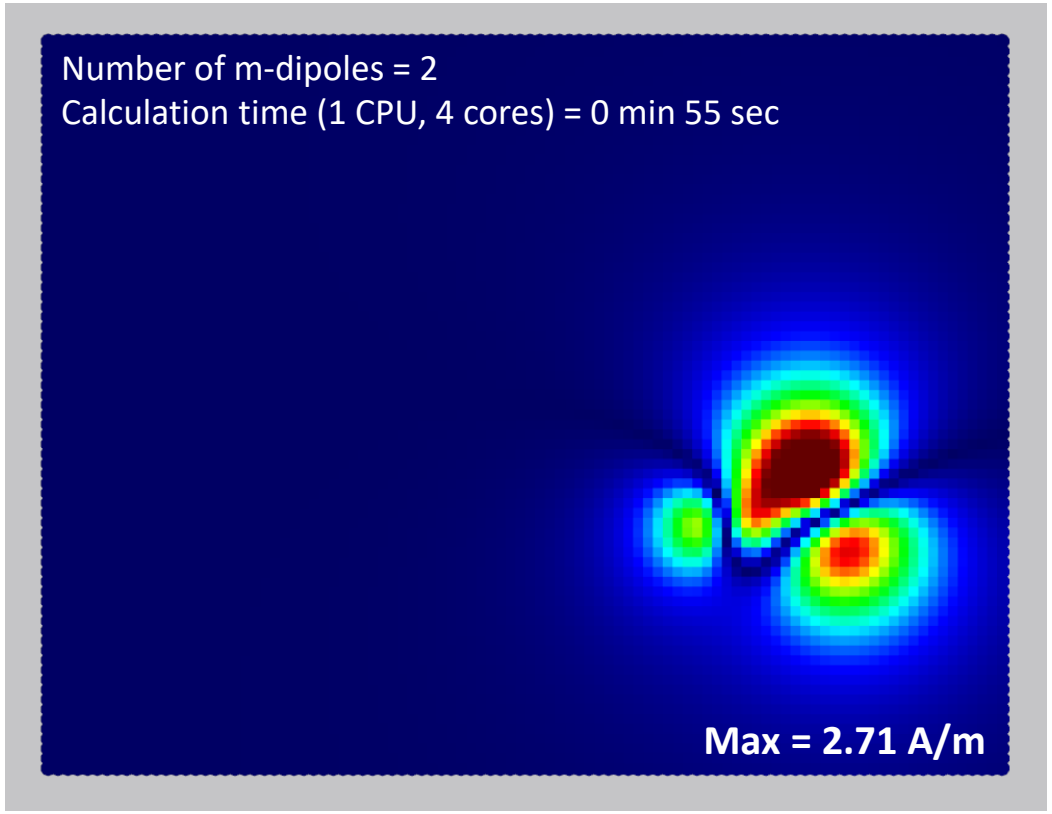


# SRC3D Application Examples

## Radiation from GSM Band Amplifier – Results Comparison




Original |Hz| field, [1.5 GHz]

Reconstructed |Hz| field, [1.5 GHz]

| Property | Value |
|---|---|
| Name | Magnetic Dipole 1 |
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| Theta | 72.0 |
| Phi | 68.5714285714 |
| Magnitude | 0.0215776242655 |
| Phase | 0.0 |

| Property | Value |
|---|---|
| Name | Magnetic Dipole 2 |
| Type | Magnetic |
| Position | [0.0512424; 0.1869256; 0.00198471406394] |
| Theta | 90.0 |
| Phi | 0.0 |
| Magnitude | 0.0059955248824 |
| Phase | 0.0 |

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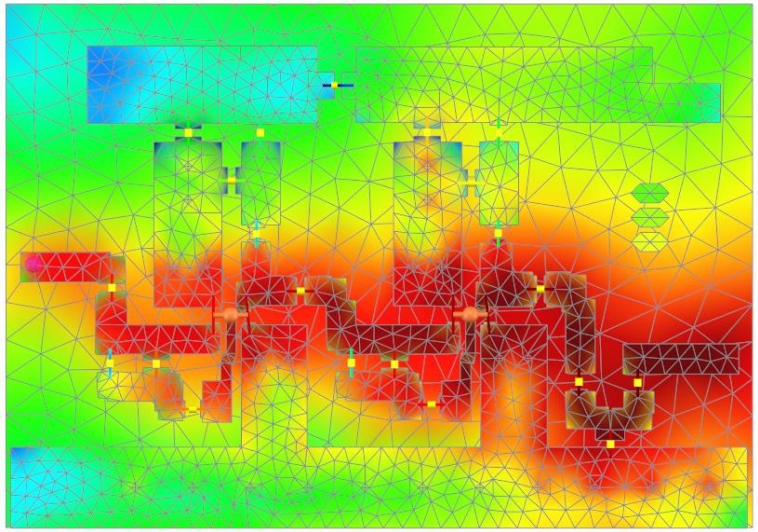
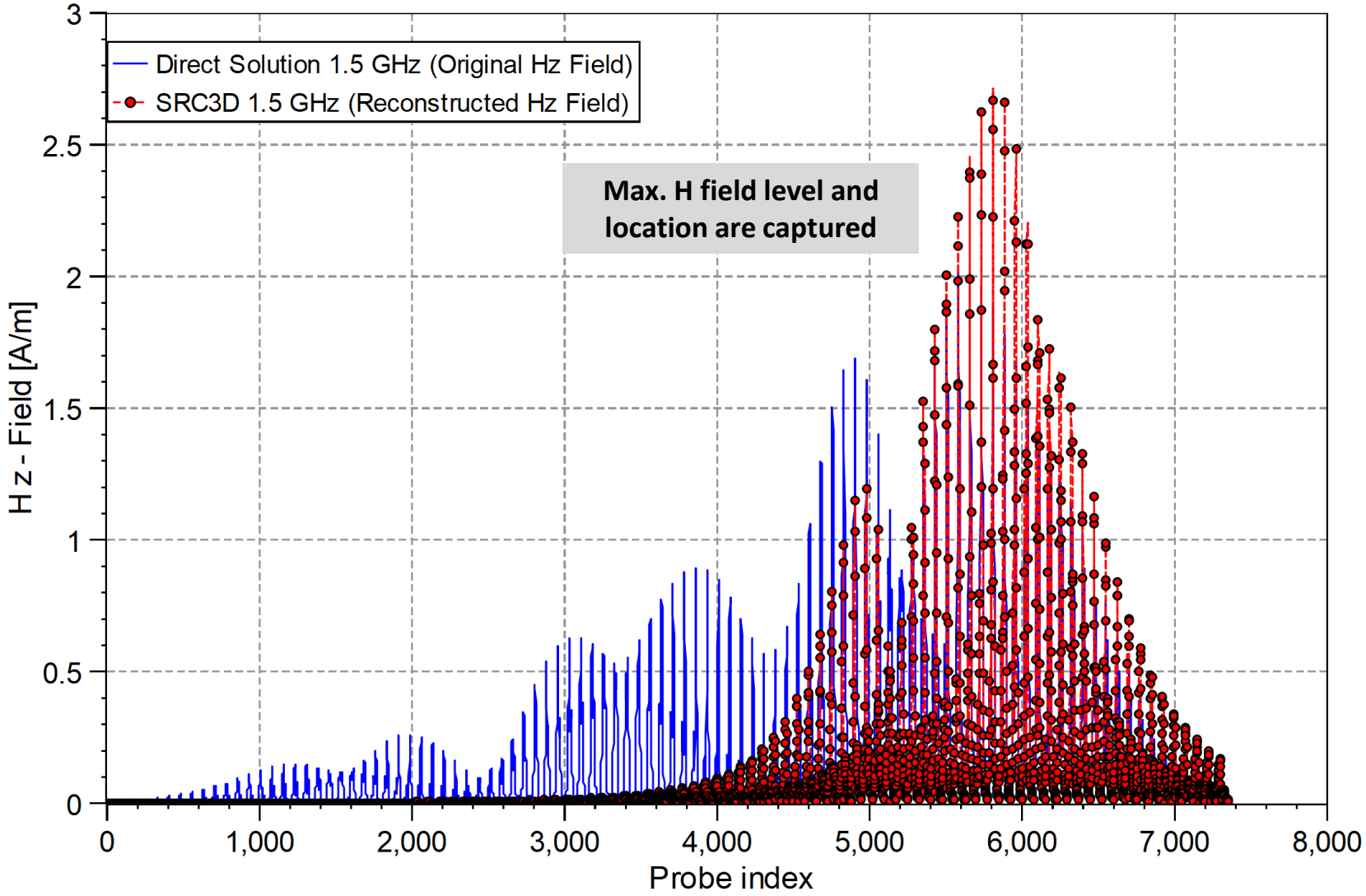
# SRC3D Application Examples

## Radiation from GSM Band Amplifier – Results Comparison

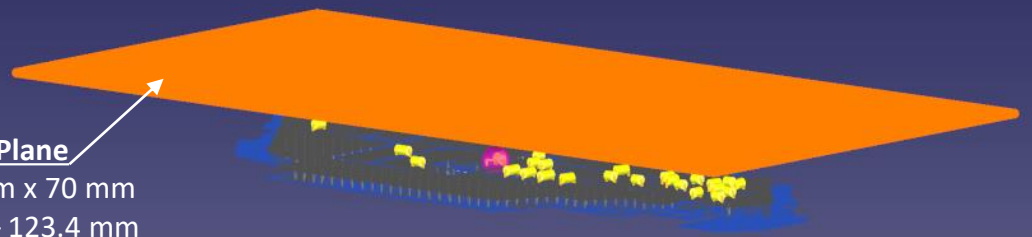


Current Distribution 1.5 GHz

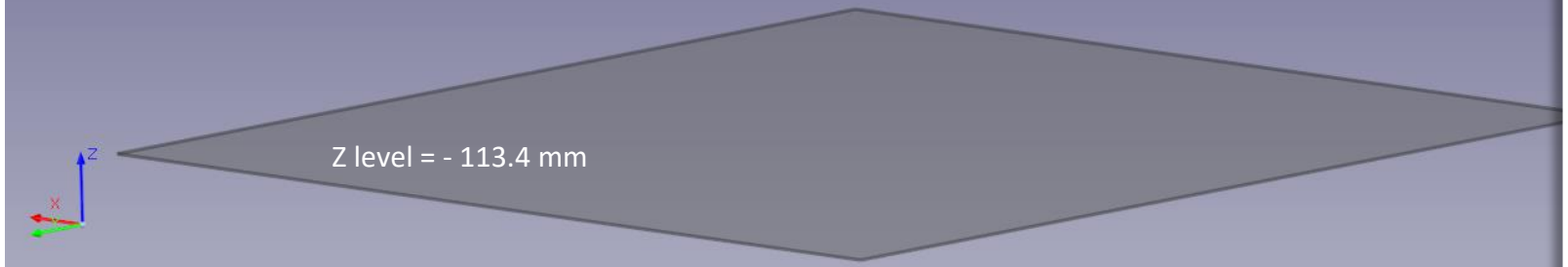


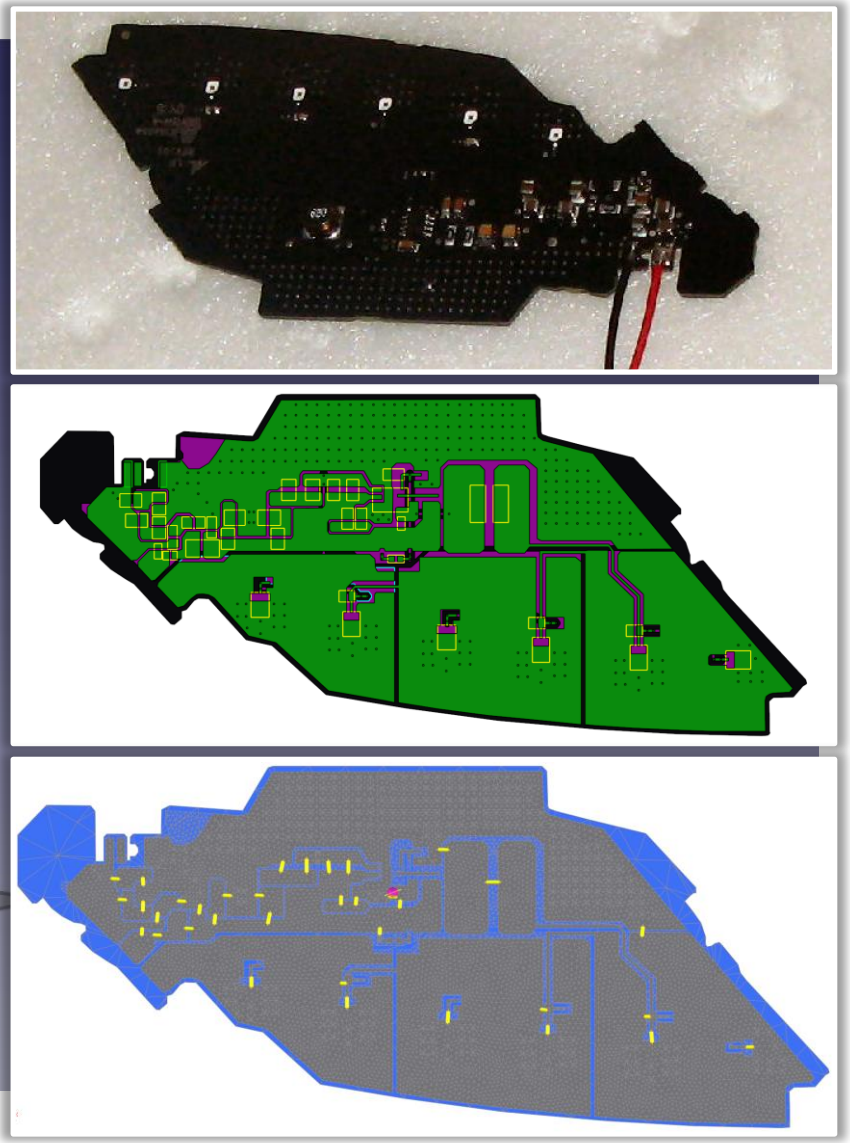
# SRC3D Application Examples

## Radiation from LED Driver – Simulation Model Description



**Near Field Scanning Plane**
Dimensions – 160 mm x 70 mm
Distance to Ground – 123.4 mm
Total number of field points – 11200

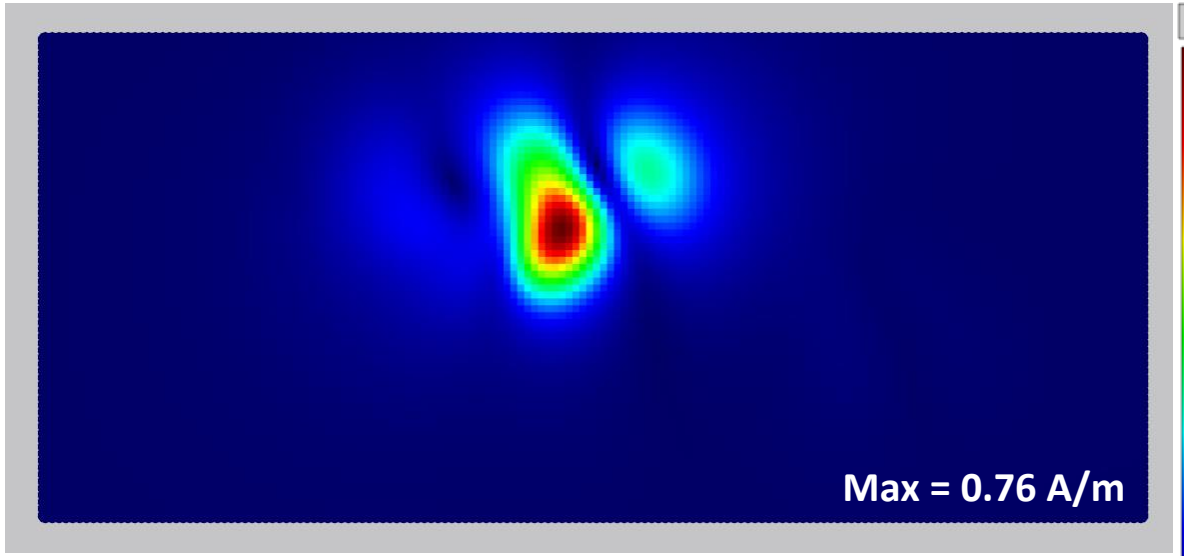


# SRC3D Application Examples

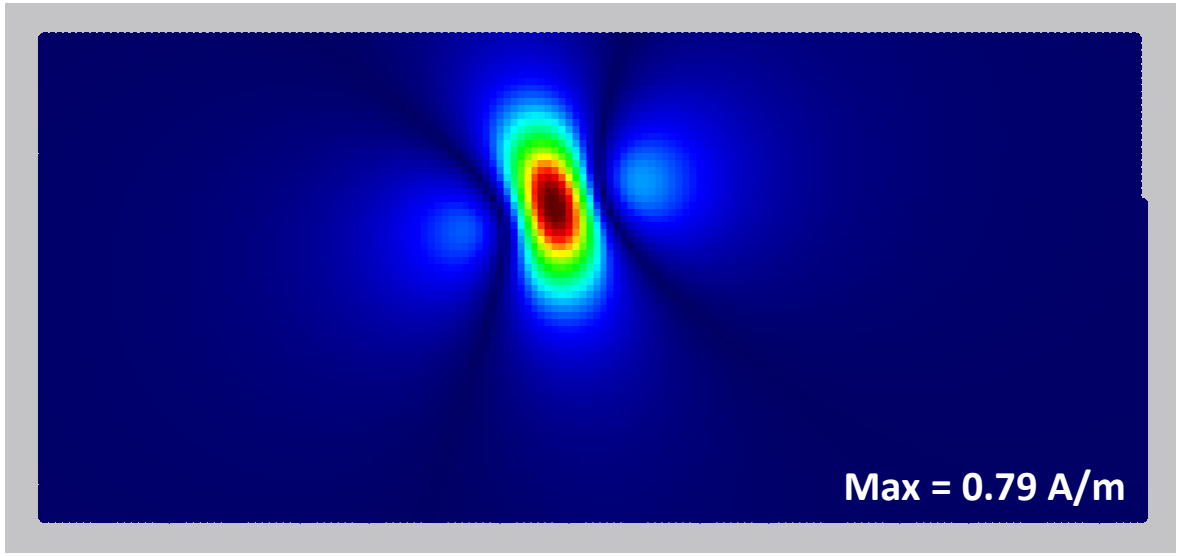
## Radiation from LED Driver – Results Comparison

Radiation from original PCB

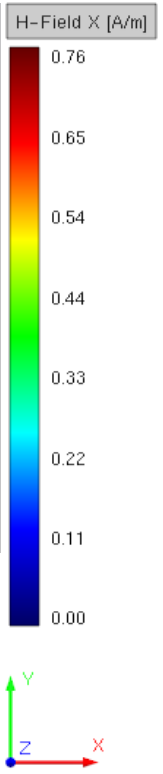



Original |Hx| field, [110 MHz]

Number of m-dipoles = 2
Calculation time (1 CPU, 4 cores) = 1 min 14 sec




Reconstructed |Hx| field, [110 MHz]

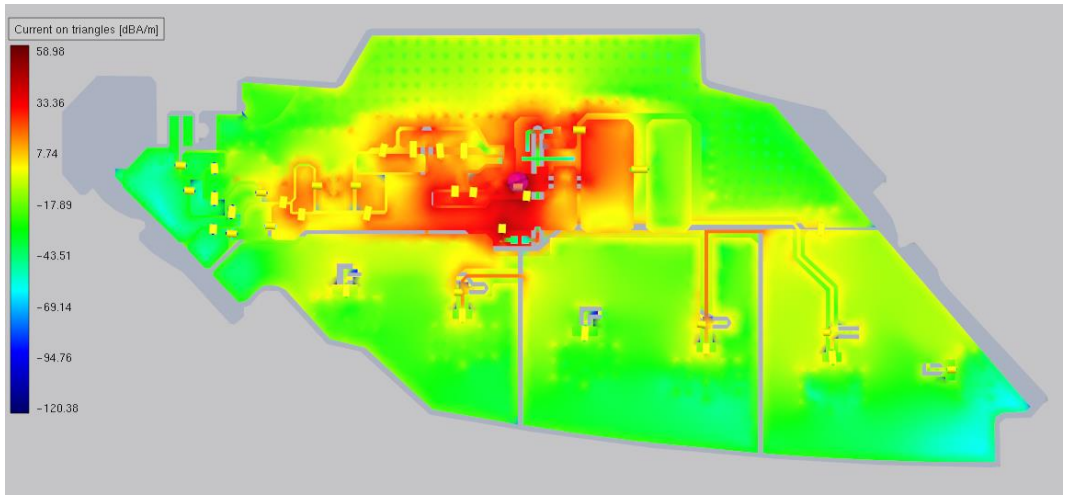



| Property | Value |
|---|---|
| Name | Magnetic Dipole 1 |
| Type | Magnetic |
| Position | [0.082; 0.049; 0.112197645677] |
| Theta | 90.0 |
| Phi | 34.2857142857 |
| Magnitude | 0.0140973387934 |
| Phase | 0.0 |

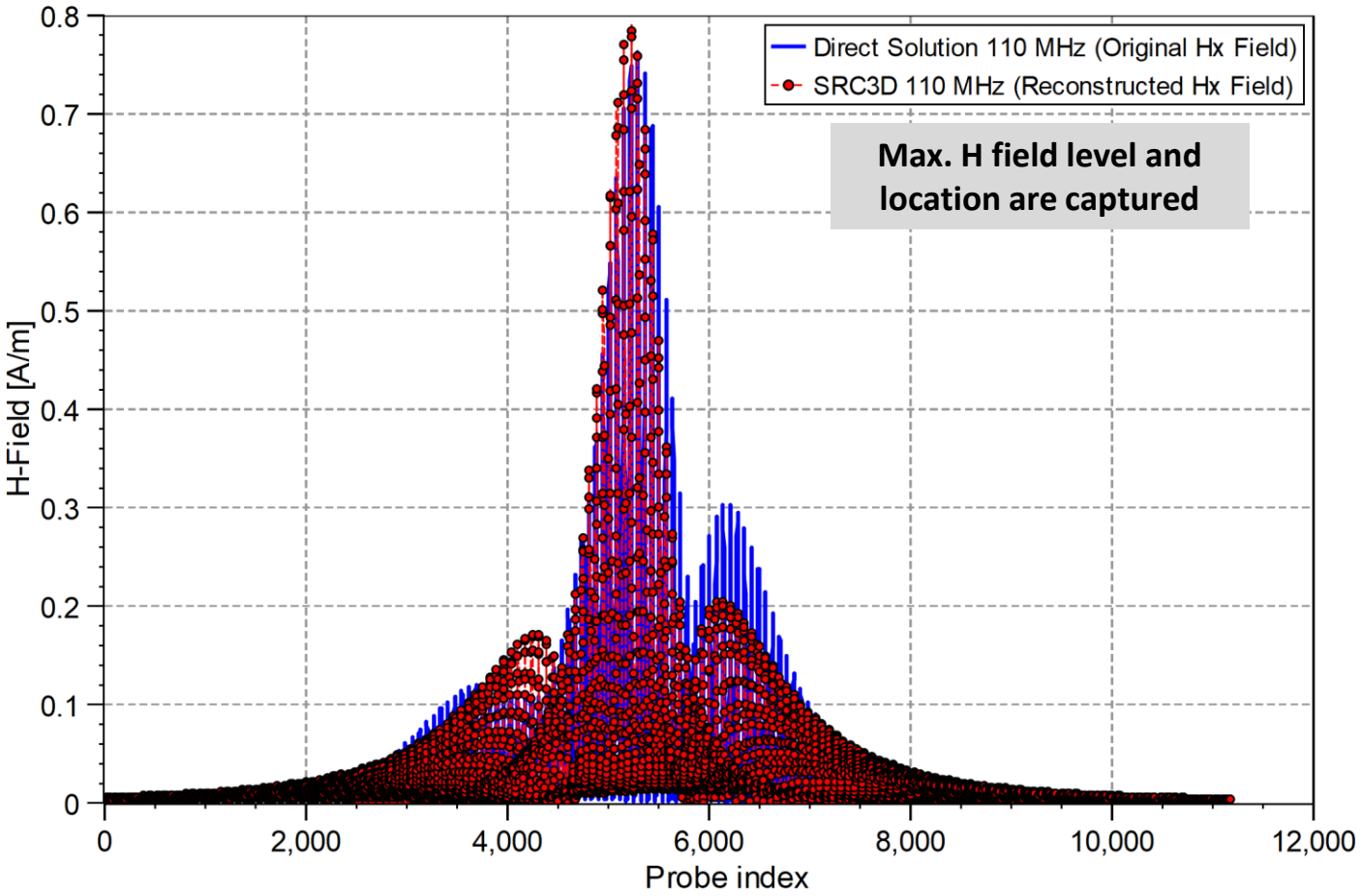
| Property | Value |
|---|---|
| Name | Magnetic Dipole 2 |
| Type | Magnetic |
| Position | [0.081; 0.042; 0.111804285942] |
| Theta | 45.0 |
| Phi | 0.0 |
| Magnitude | 0.00149734226683 |
| Phase | 0.0 |

# SRC3D Application Examples

## Radiation from LED Driver – Results Comparison



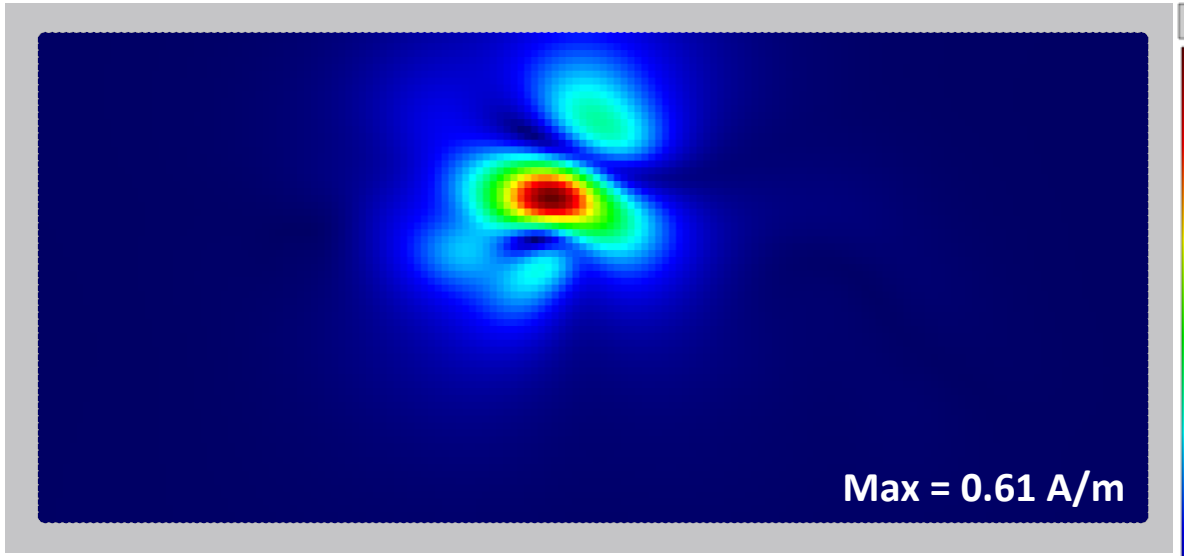

Current Distribution 110 MHz



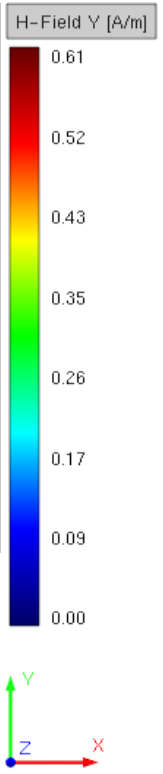
# SRC3D Application Examples

## Radiation from LED Driver – Results Comparison

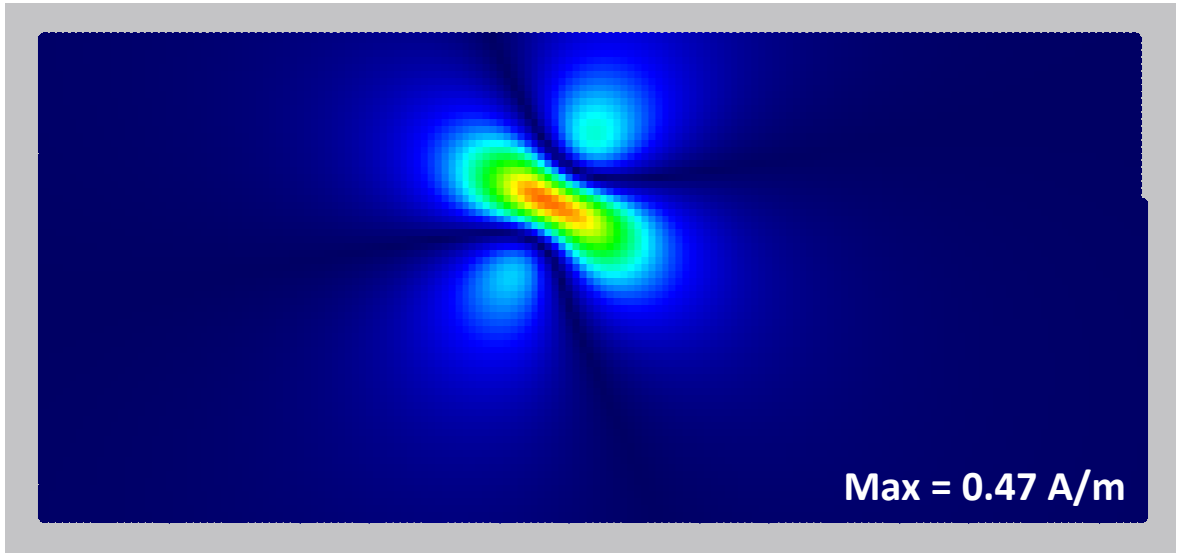
Radiation from original PCB




Original |Hy| field, [110 MHz]




Number of m-dipoles = 2
Calculation time (1 CPU, 4 cores) = 1 min 14 sec




Reconstructed |Hy| field, [110 MHz]

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| Position | [0.082; 0.049; 0.112197645677] |
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| Phi | 34.2857142857 |
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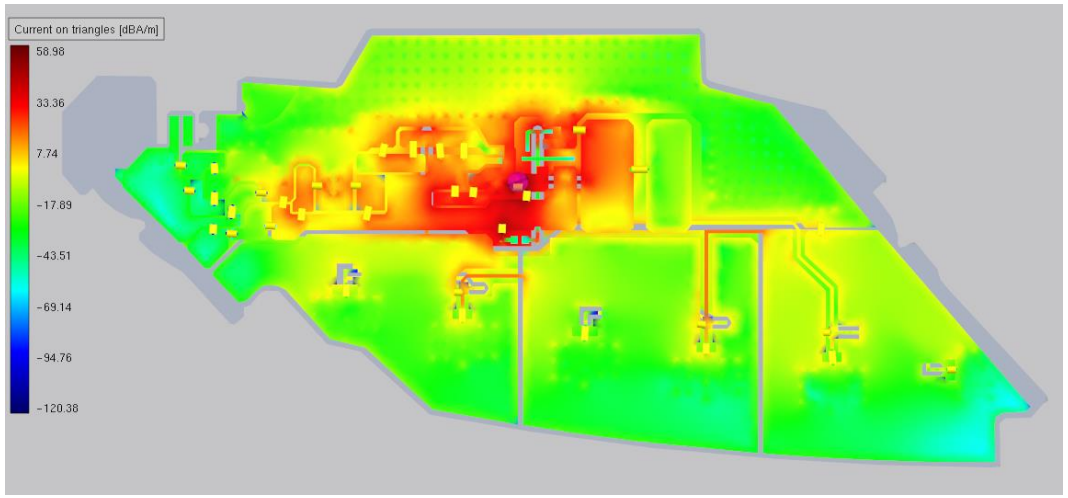
| Phase | 0.0 |

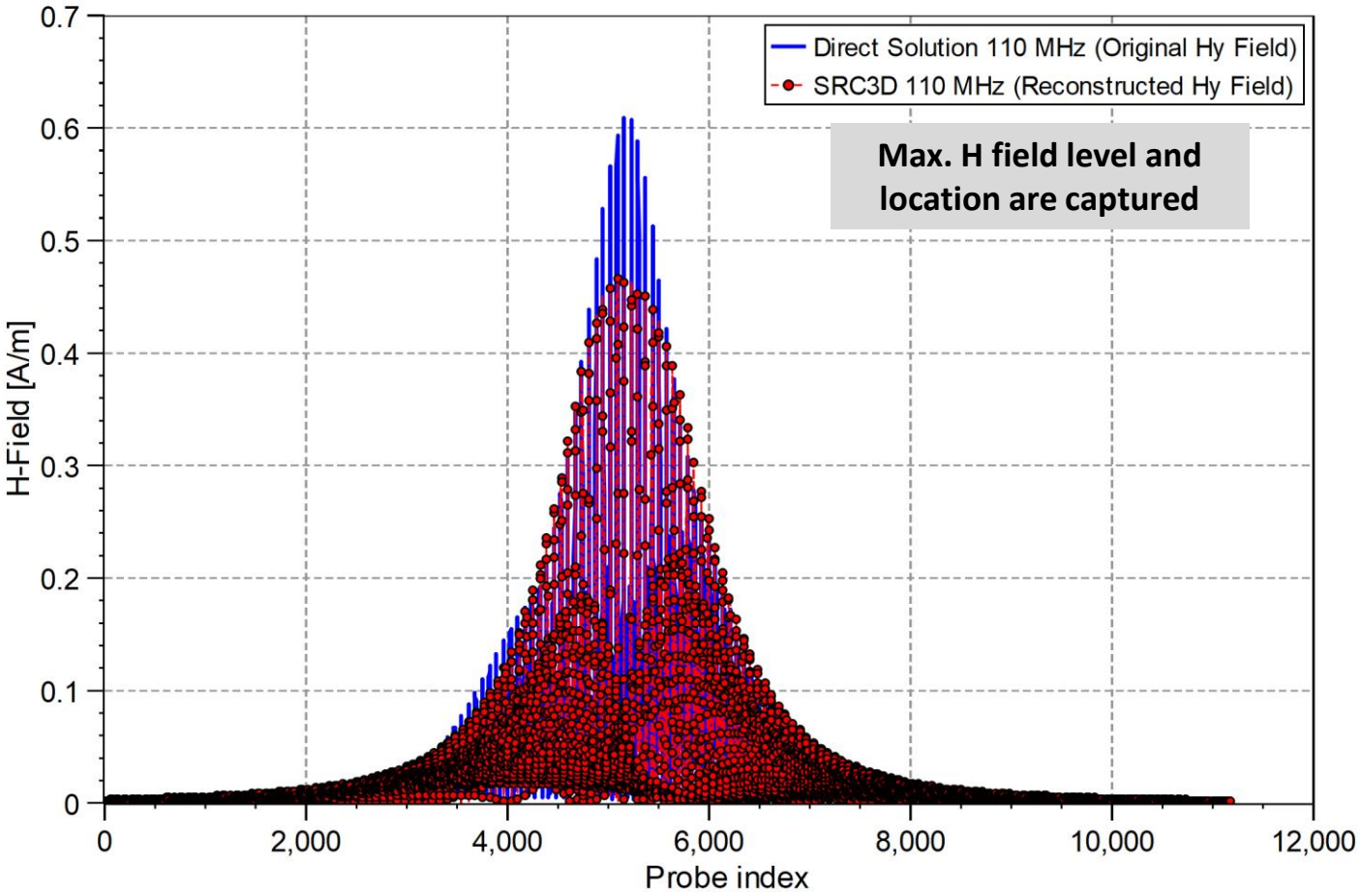
| Property | Value |
|---|---|
| Name | Magnetic Dipole 2 |
| Type | Magnetic |
| Position | [0.081; 0.042; 0.111804285942] |
| Theta | 45.0 |
| Phi | 0.0 |
| Magnitude | 0.00149734226683 |
| Phase | 0.0 |

# SRC3D Application Examples

## Radiation from LED Driver – Results Comparison



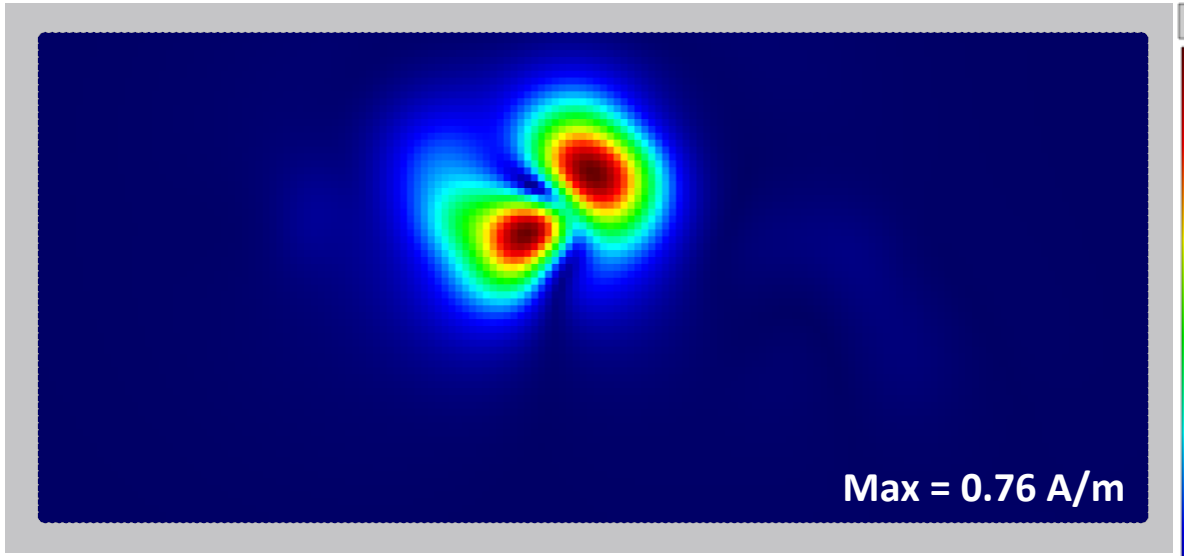

Current Distribution 110 MHz



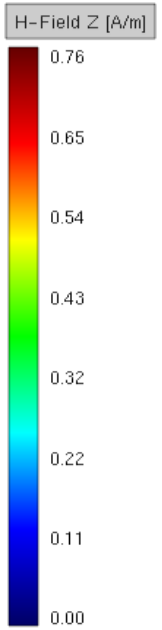
# SRC3D Application Examples

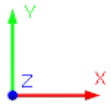
## Radiation from LED Driver – Results Comparison

Radiation from original PCB

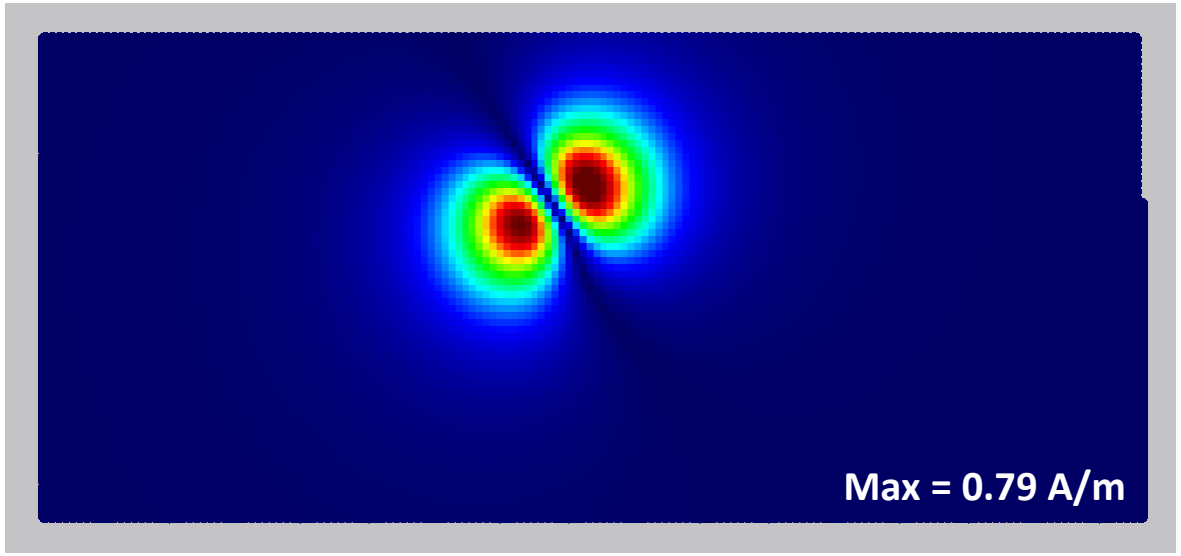



Original |Hz| field, [110 MHz]




Number of m-dipoles = 2
Calculation time (1 CPU, 4 cores) = 1 min 14 sec



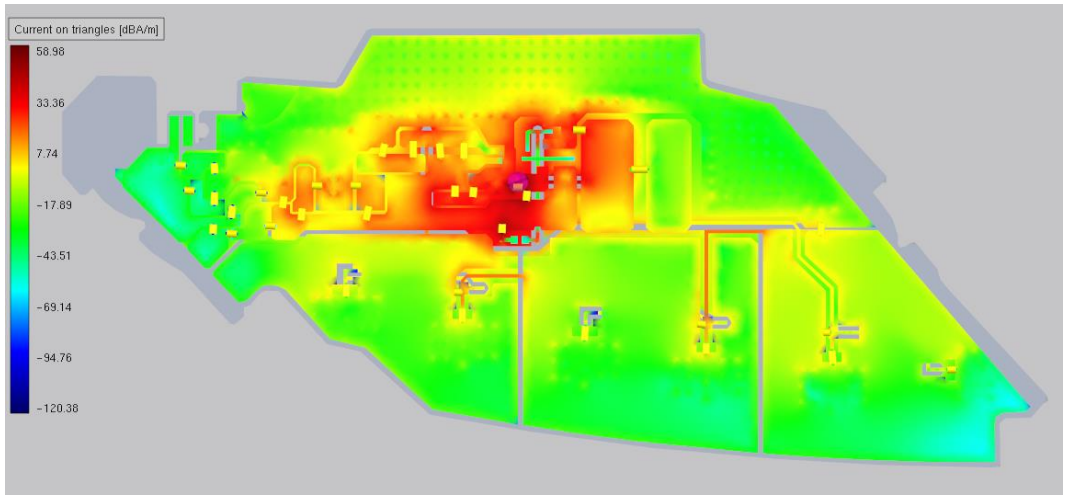

Reconstructed |Hz| field, [110 MHz]

| Property | Value |
|---|---|
| Name | Magnetic Dipole 1 |
| Type | Magnetic |
| Position | [0.082; 0.049; 0.112197645677] |
| Theta | 90.0 |
| Phi | 34.2857142857 |
| Magnitude | 0.0140973387934 |
| Phase | 0.0 |

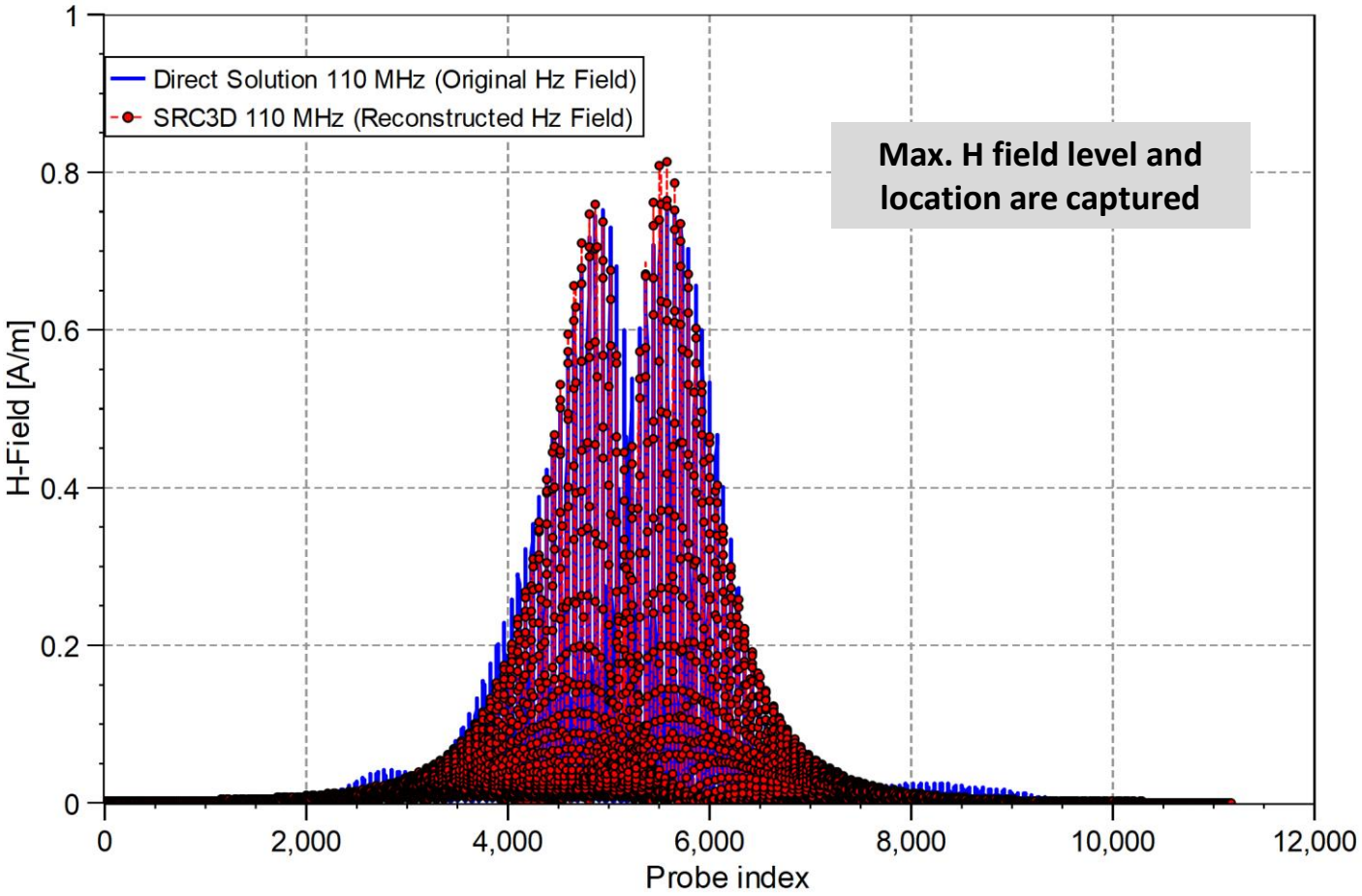
| Property | Value |
|---|---|
| Name | Magnetic Dipole 2 |
| Type | Magnetic |
| Position | [0.081; 0.042; 0.111804285942] |
| Theta | 45.0 |
| Phi | 0.0 |
| Magnitude | 0.00149734226683 |
| Phase | 0.0 |

# SRC3D Application Examples

## Radiation from LED Driver – Results Comparison




Current Distribution 110 MHz



# Thank you for your attention!

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